Second Five-Year Review Report

for

Chemical Control Corporation Superfund Site

City of Elizabeth, Union County, New Jersey

January 2004

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

139660

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name *(from WasteLAN)*: Chemical Control Corporation

EPA ID *(from WasteLAN)*: NJD000607481

Region: 2	**State:** NJ	**City/County:** Elizabeth/Union County

SITE STATUS

NPL Status: X Final ☐ Deleted ☐ Other (specify) _____

Remediation Status (choose all that apply): ☐ Under Construction ☐ Operating X Complete

Multiple OUs? ☐ YES X NO	**Construction completion date:** 06/30/1994

Has site been put into reuse? ☐ YES X NO ☐ N/A

REVIEW STATUS

Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Nigel Robinson

Author title: Remedial Project Manager	**Author affiliation:** EPA

Review period:** 09/30/1998 to 09/30/2003

Date(s) of site inspection: 08/07/2003

Type of review:

☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion X Statutory

Review number: ☐ 1 (first) X 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU# 1: 9/30/1984
☐ Construction Completion X Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date *(from WasteLAN)*: 09/28/1998

Due date *(five years after triggering action date)*: 09/28/2003

Does the report include recommendation(s) and follow-up action(s)? ☐ yes X no
Is human exposure under control? X yes ☐ no
Is contaminated groundwater under control? X yes ☐ no ☐ not yet determined
Is the remedy protective of the environment? X yes ☐ no ☐ not yet determined

Table of Contents

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
HRC	Hydrogen Release Compound
NJDEP	New Jersey Department of Environmental Protection
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
ORC	Oxygen Release Compound
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRP	Potentially Responsible Party
PSD	Primary Settling Defendant
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments & Reauthorization Act
SDWA	Safe Drinking Water Act
TBC	"To Be Considered" Criteria
VOC	Volatile Organic Compound

Executive Summary

The Remedy for the Chemical Control Superfund Site in Elizabeth, New Jersey included the solidification of over 18,000 cubic yards of soils contaminated with a variety of metals and organic compounds. It also involved the construction of a slurry wall around the perimeter of the solidified soil mass to isolate it from direct contact with the groundwater and surface water from the adjacent Elizabeth River. The remedy includes institutional controls and groundwater monitoring to assess the performance of the solidified mass. The trigger for this second five-year review was the completion of the first five-year review in September 1998.

The assessment of this second five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The remedy is functioning as intended and is protective of human health and the environment.

I. Introduction

This second five-year review for the Chemical Control Corporation Site (Chemical Control), located in the City of Elizabeth, Union County, New Jersey, was conducted by EPA Remedial Project Manager (RPM), Nigel Robinson. The five-year review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the decision documents. This document will become part of the site file.

In accordance with the Section 1.5.3 of the five-year review guidance, a statutory five-year review is triggered by the signature date of the previous five-year review report. The trigger for this five-year review was the first Five-Year Review Report, which was signed on September 28, 1998. The 1998 Five-Year Report indicated that based on EPA's review, it was not evident that the remedy at the Chemical Control Site was protective of human health and the environment. EPA stated its intent to verify the protectiveness of the remedy and, if necessary, to make the remedy protective.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery to the first five-year review.

III. Background

Physical Characteristics

The Chemical Control property is located at 23 South Front Street. It is part of a narrow peninsula formed by the Elizabeth River and the Arthur Kill. This peninsula was a marsh until it was filled in to prepare it for industrial development. The Elizabeth River, the Arthur Kill, and the water table aquifer at the site are all saline and tidally influenced. The site is flat and barely above sea level.

Land and Resource Use

Land usage in the immediate site vicinity is industrial. The site is bordered on the east by a building owned by the Loizeaux Ready-Mix, on the west by a scrap metal yard, on the north by the Elizabeth River and on the south, across South Front Street, by the Loizeaux Ready-Mix plant.

Geology

The bedrock below the site is the Brunswick Formation, part of the Newark group of sediments deposited in the Newark Basin during the Triassic Period. The Newark Group consists of 16,000 to 20,000 feet of non-marine clastics, with some intrusive and extrusive basic igneous rocks. The Brunswick Formation is the thickest of the three formations comprising the Newark Group. In the Newark area this formation is estimated to be 6,000 feet thick.

In the vicinity of the site the Brunswick Formation is characterized as a fine-grained shale to siltstone. It has a characteristic red color.

The Brunswick Formation is overlain throughout most of Union County by Pleistocene glacial deposits from the Wisconsin glaciation. These glacial deposits are found in varying thickness, at some locations filling pre-glacial valleys with stratified outwash deposits. Unstratified glacial drift forms a mantle over the Brunswick throughout most of Union County.

The recent depositional history is from overbank stream deposits formed after the glacial retreat. Mud and silts with inclusions or organic materials are common in the Newark area and along the Arthur Kill. Following this deposition, much low-lying land has been reclaimed and built up with an artificial fill. The overburden of glacial deposits and fill material is approximately 9-11feet thick. A clay layer underlines the site; it is found 14-18 feet below the surface. The mean depth to groundwater is approximately 4-7 feet.

History of Contamination

From 1970 to 1978, Chemical Control Corporation operated as a hazardous waste storage, treatment, and disposal facility, accepting various types of chemicals including: acids, arsenic, bases, cyanides, flammable solvents, polychlorinated biphenyls (PCBs), compressed gases, biological agents and pesticides. Throughout its operations, the Chemical Control Corporation was cited for discharge and waste storage violations. The facility operated until March 1979, when it was closed due to numerous environmental and safety violations.

Shortly after the facility ceased operations, the New Jersey Department of Environmental Protection (NJDEP) developed and began to implement a site cleanup strategy. On April 21, 1980, a fire of unknown origin started at the site and burned for a period of 10 hours. The fire destroyed most of the structures and other materials on-site. After the fire, the NJDEP continued the initial remediation of the site. In general, the initial remediation included: 1) removal of several thousand drums and other materials; 2) construction of a berm along the Elizabeth River; 3) removal of the top three feet of soil from the site; and 4) backfilling of the site with clean coarse gravel.

Initial Response

The State began clean-up of the site in March 1979 which removed 55,400 pounds of bulk solids, 1800 gallons of bulk liquids, nearly 10,000 drums of waste, 83 gas cylinders, 10 pounds of infectious wastes, 7 pounds of radioactive wastes and 24 gallons of highly explosive liquids. Before the site clean-up was completed, on April 21, 1980 an explosion and fire occurred at the site which was not brought under control for more than ten hours. The explosion and fire destroyed buildings at the site and reportedly launched drums of burning waste into the air.

NJDEP continued its (pre-Superfund) clean-up operation after the fire and removed all building debris, drums (found on and below the surface) and tanks from the site. Three feet of surface soil was also removed from the site and from the property across the street that had been used as a staging area during the clean-up. This soil was replaced with three feet of gravel. Gas cylinders, which were discovered during the operation, were stored at the site. NJDEP also operated a groundwater recovery and treatment system from November 1980 through July 1981.

In 1983, EPA signed a Record of Decision (ROD) that addressed the remaining cleanup activities at the site as a result of the fire. These activities included:

- the testing, removal and disposal of 200 cylinders found at the site, the removal and disposal of drums, pails, gas cylinders and other materials found in the Elizabeth River,
- cleaning of sewers, catch basins and curbing and,
- the decontamination of trailers and vacuum truck.

This work was implemented by EPA in several phases, the last of which (the disposal of the gas cylinders) was completed in September 1990.

Basis for Taking Action

The Chemical Control site was proposed for inclusion to the National Priorities List (NPL) of Superfund sites in October 1981. The site became final in September 1983. A remedial investigation and feasibility study (RI/FS) was conducted at the Site from 1985 to 1986. The study determined that contaminants were found in the soils, groundwater, surface water and sediments included, but not limited to the following:

acetone	2-butanone
vinyl chloride	benzene
toluene	ethylbenzene
chlorobenzene	trichloroethane
1,2-dichloroethene	PCBs
di-n-butyl phthalate	benzyl alcohol
benzoic acid	pyrene
naphthalene	fluorene

IV. Remedial Actions

Remedy Selection

Based on the results of the RI/FS, EPA signed a second ROD for the site on September 23, 1987. The ROD called for:

- Treatment of 18,000 cubic yards of contaminated soil at the site using in-situ fixation;
- Removal of debris from earlier response actions, including drill cuttings, monitoring well development water, items recovered from the Elizabeth River under the initial remedial measures, used equipment and the decontamination pad;
- Sealing of the sanitary sewer line under the site where it connects to the South Front Street storm sewer.
- Repair of the berm that separates the site from the Elizabeth River; and
- Collection and analysis of environmental samples, as required, to ensure the effectiveness of the remedy.

Remedy Implementation

On October 23, 1990, the Primary Settling Defendants (PSDs) for the Chemical Control Corporation entered into a Consent Decree with EPA for the implementation of the remedy as selected by the ROD. Construction started at the site in August 1993 and was completed in April 1994. In addition to the 1987 ROD remedy, the PSDs incorporated a slurry wall into the remedy. The purpose of the slurry wall was to further isolate and contain the solidified soils. The slurry wall was constructed around the perimeter of the site and anchored into a clay layer underlying the site. By anchoring it into the clay layer, the surrounding ground water was cut off from entering and leaving the site. The top of the solidified mass was designed to prevent water infiltration into the solidified mass and maximize surface water runoff toward the Elizabeth River. Finally, an 8-foot chain-link fence was installed around the site to restrict unauthorized access.

System Operations/Operation and Maintenance and Monitoring

The PSDs are conducting long-term monitoring and maintenance activities according to the operation and maintenance (O&M) plan that was approved by EPA in November 1992. The primary activities associated with the O&M included the following:

- Visual inspection of the surface and solidified mass with regards to erosion, drainage, the

chain link fence and vegetation;

- Groundwater and surface water sampling; and
- Groundwater elevation monitoring.

Site inspections were initially performed on a quarterly basis; however, with EPA's concurrence they are now performed on an annual basis. As discussed later in this report the PSDs have initiated bio-remediation activities. As a consequence of this work, groundwater and surface water sampling have been temporarily suspended and they will resume at the completion of the bio-remediation activities.

V. Five-Year Review Process

Administrative Components

The five-year review team consisted of Nigel Robinson (Remedial Project Manager), Michael Scorca (Hydrogeologist), Michael Sivak (Risk Assessor), and Pat Seppi (Community Involvement Coordinator) of EPA.

Community Involvement

EPA notified the community of the initiation of the five-year review process by publishing a notice in the Star-Ledger Newspaper in August 2003. The notice indicated that EPA would be conducting a five-year review of the remedy at the Chemical Control Site to ensure the remedy remains protective of public health and is functioning as designed. It was also indicated that, once the five-year review is completed, the results will be made available in the local site repositories. In addition, the notice included the RPM's address and telephone number for questions related to the five-year review process for the Chemical Control Site.
The RPM has not been notified of any additional concerns with the remedy that were not already under consideration in this review.

Document Review

The documents, data, and information which were reviewed in completing the five-year review are found in Table 4.

Data Review

The data reviewed included the data from the first five-year review and subsequent monitoring data from 1998 through 2002. In 2002, the monitoring program was temporarily suspended pending implementation of the in-situ remediation, as discussed below.

Site Inspection

A site inspection for this five-year review was conducted on August 7, 2003 by Nigel Robinson. The site was inspected for general conditions, drainage, debris and access controls. The site was found to be in good condition. The fence surrounding the site remains intact, there are no visible signs of trespassing onto the site, and the site is free of debris. The top/surface of the solidified mass is constructed with a gradient that allows for maximum rainfall runoff from its surface to the Elizabeth River; it continues to function as designed. The solidified mass is devoid of vegetation. Vegetation found at the site is located along the bank of the Elizabeth River and is primarily wetlands vegetation. This vegetation is similar to other areas near the river and the vicinity of the site and does not suggest that environmental conditions are being degraded as a result of proximity to the site.

Interviews

Site remedies were discussed with the State program representatives and PSD representatives. There were no interviews with local government officials or community representatives.

Last Five-Year Review

In the previous five-year review, the effectiveness of the remedy was assessed by monitoring the groundwater immediately adjacent to the solidified mass. As described in the 1992 O&M plan, in defining a monitoring mechanism to measure the effectiveness of the remedy, a net decrease method was decided upon. The aim was to determine whether there was a net decrease in the contaminants emanating from the solidified mass. The net difference was to be ascertained by comparing the post-remediation mean concentrations of a given contaminant in a given monitoring well with the pre-remediation mean concentration in that well. The aim was to achieve a significant net decrease between the post-remediation and the pre-remediation mean concentration for each compound.

Vinyl chloride and 2-butanone were selected as the indicator compounds, and three monitoring wells (CW-3, CW-4 and CW-5) situated between the Elizabeth River and the solidified slurry wall were sampled for these compounds in accordance with the 1992 O&M plan. When statistical analysis was performed on the data, it suggested that a significant statistical reduction occurred between the pre-and post-remediation. However, a closer look at the data showed that this reduction occurred around the time the soils were solidified. The indicator parameters are generally below the detection limits in wells CW-4 and CW-5. However, since solidification, there was very little further reduction in the vinyl chloride and 2-butanone concentrations in well CW-3. Moreover, absolute concentrations of the indicator parameters remained relatively high. Based on the data, EPA made the determination that it was not evident that the remedy at the Chemical Control site was protective of human health and the environment and that EPA would take action to verify the protectiveness of the remedy and, if necessary, to make the remedy protective. In addition, a question was raised whether these groundwater monitoring wells were

the appropriate way of monitoring the effectiveness of the remedy.

Progress Since the Last Review

Since the last five-year review, several theories were suggested for the contamination found in CW-3. It was suggested that the contamination resulted from: (1) leakage from the solidified mass; (2) a continuing source from the adjacent property (not attributable to the NPL Site); or (3) a result of residual contamination in a small area of untreated soils between the slurry wall and the Elizabeth River. The PSDs evaluated the alternatives and suggested that the third (residual contamination) was the likely cause. In addressing this contamination, the PSDs have implemented an in-situ bioremediation treatment for both the soils and groundwater. The in-situ treatment was initiated in the November 2002 and is being phased in over a period of 18 to 24 months. The first phase involved the application of Hydrogen Release Compounds (HRC) that stimulate and promote anaerobic in-situ bioremediation of chlorinated hydrocarbons in the saturated soil zone. The second phase of remedial activities will consist of the application of Oxygen Release Compounds (ORC) that will promote aerobic in-situ bioremediation of petroleum hydrocarbons (i.e., benzene, toluene, ethylbenzene, xylenes). Sampling of soils and groundwater is performed to monitor the progress of the HRC treatment.

After the HRC application in November 2002, groundwater quality was analyzed quarterly to monitor HRC dissolution into saturated soil and anaerobic conditions promoted by the HRC. The quarterly monitoring indicated that conditions were favorable for in-situ bioremediation. Soil and groundwater sampling to assess the progress of the reduction of chlorinated VOCs was conducted in August 2003, nine months after the HRC application. A preliminary review of the results indicate that HRC has been effective in addressing chlorinated VOCs in the dissolved phase, and shows some promise in addressing chlorinated VOCs in soils. The application of ORC is planned for the summer of 2004.

VI. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

A significant amount of contamination was removed off-site to acceptable disposal facilities during early response actions. Remaining contamination (with the possible exception of the soils now the subject of further in-situ treatment) is contained within the solidified mass thereby removing direct contact (i.e., ingestion or dermal contact of soil) exposures to the public. NJDEP is in the process of implementing a Classification Exemption Area at the site to restrict future groundwater use. In addition, the existing fencing of the site helps to prevent potential exposures to the public, including trespassers.

The potential impact to groundwater is being addressed by the diversion of surface water across the site and the diversion of groundwater by the construction of a slurry wall. In addition, there are no drinking water sources in the vicinity of the site.

Per the O&M plan, one solidified soil core sample is tested per year to determine its permeability. The result of this testing program is extrapolated to assess the performance of the solidified mass. Table 3 lists the solidified core permeability test results. The 2003 results indicate a hydraulic conductivity of 4.7×10^{-9} cm/sec. Comparing these results with those collected over the last eight years indicate that the soil/concrete cores are approaching a final hydraulic conductivity around 4×10^{-9} cm/sec. To put this into perspective, the clay layer in a RCRA composite landfill cap is specified at 1×10^{-8} cm/sec. Thus, the results of the testing program indicate that the solidified mass has reached a level of impermeability greater than clay. The solidified samples are also tested for unconfined compressive strength and Toxicity Characteristic Leaching Procedure (TCLP). The samples continue to meet or exceed the level set by EPA for both of these tests.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Soil and groundwater use are not expected to change during the next five years, the period of time considered in this review. The land use considerations and potential exposure pathways considered in the baseline human health risk assessment are still valid. In addition, the soil has been stabilized and capped and the remedy should prevent leaching of contaminants into the groundwater or dispersal of dust into the air.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

- Site contaminants are contained in a solidified mass at the site which is intact and in good condition.
- A slurry wall around the solidified mass appears to be intact and the site drainage system is in good condition.
- The fence around the site is in good repair and appropriate institutional controls are in place.
- There is no evidence of trespassing, vandalized damage to the site remedy or to the monitoring wells.

- There are no drinking water wells or withdrawals of water from drinking purposes in this area.

- A small area of contamination may exist in the vicinity of CW-3. This is being addressed by an in-situ bioremediation. The limited contamination does not appear to cause any significant degradation of the groundwater or surface water and is considered an ongoing action that is part of the routine adjustment of the operation and maintenance needs of the site. It does not appear to significantly affect human health and the environment.

VII. Recommendations and Follow-Up Actions

There are no recommendations or follow up actions associated with this review. There is ongoing maintenance and monitoring that may cause EPA to change its position in the future. EPA has decided not to complete deletion of this site until it is satisfied that the contamination around well CW-3 has been properly addressed.

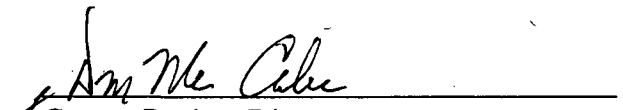
VIII. Protectiveness Statement

Based upon a review of the ROD, Remedial Action Report, Site Monitoring Reports, Operations and Maintenance/Post-Remediation Plan, Focused Remedial Assessment for CW-3 Soils and site inspections, the solidified soils at the site currently protect human health and the environment. However, the area of soils along the Elizabeth River that was previously untreated and is now being treated through in-situ remediation may pose a limited risk to human health and the environment. There does not appear to be any exposure to human or environmental receptors from site contaminants and none is expected over the next five years.

IX. Next Review

Since hazardous substances, pollutants or contaminants remain at the Chemical Control site above levels which would allow for unlimited use or unrestricted exposure, EPA will conduct another five-year review on or before December 2008.

Approved:



George Pavlou, Director
Emergency and Remedial Response Division

1-6-04
Date

TABLES

Table 1: Chronology of Site Events

Events	Date
Hazardous waste disposal site	1970-1979
NJDEP initiated interim corrective measures	1979
An extensive fire destroyed the Site	1980
State operated groundwater recovery and treatment system	1980-1981
Preliminary cleanup completed by NJDEP	1981
Early Action Record of Decision (ROD) signed by EPA	1983
Final Listing on the National Priorities List	1983
EPA Initiated Interim Measures (required by 1983 ROD)	1985-1986
Remedial Investigation/Feasibility Study (RI/FS) conducted	1985 - 1987
EPA issued a Final Record of Decision (ROD)	1987
EPA Completed Cylinder Disposal (from 1983 ROD)	1989-1990
EPA and Settling Defendants entered into CD to conduct RD/RA	1991
Settling Defendants submited Draft Design Report to EPA	1991
EPA approved Design Report	1992
Construction of remedy began	1993
Completion of construction activities	1993
EPA completed first five-year review	1998

Table 2: Annual System O&M Costs

Dates	Total Costs rounded to nearest $1,000
1999	$43,668
2000	$29,514
2001	$19,823
2002	$50,030
2003 (to date)	$28,756

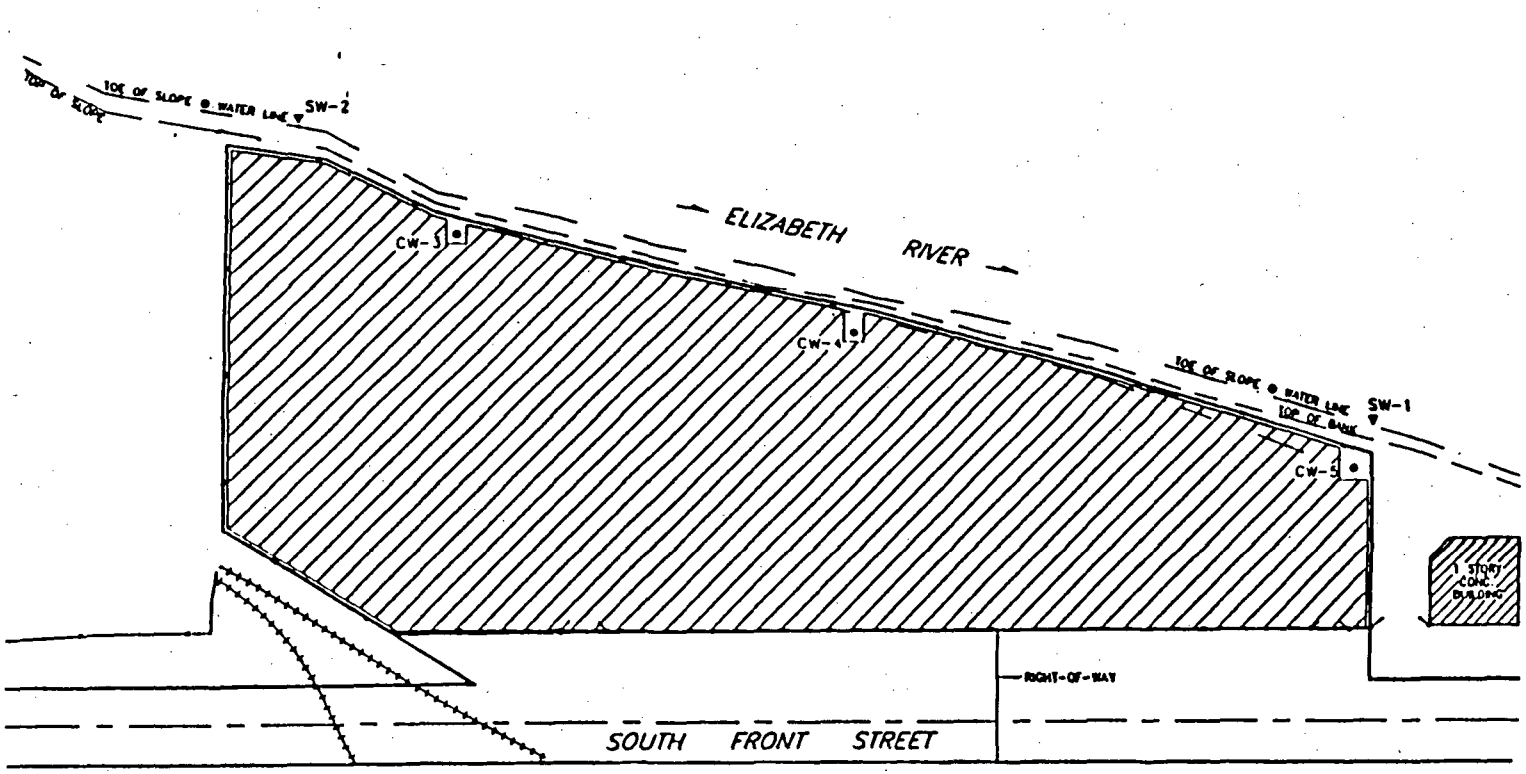
Table 3: Solidified Core Permeability Results

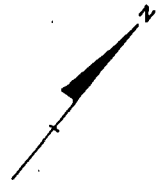
Test Date Qtr.	Year	Hydraulic Conductivity Test Results (cm/sec)
3Q	1994	9.6×10^{-8}
4Q	1995	7.5×10^{-8}
4Q	1996	2.8×10^{-8}
4Q	1997	7.3×10^{-8}
---	1998	---
1Q	1999	1.5×10^{-8}
1Q	2000	2.7×10^{-8}
—	2001	---
2Q	2002	4.0×10^{-9}
3Q	2003	4.1×10^{-9}

Table 4: List of Document Reviewed

- Five-Year Review Report for the Chemical Control Superfund Site - September 1998
- Record of Decision for the Chemical Control Superfund Site - September 1983
- Record of Decision for the Chemical Control Superfund Site - September 1987
- Consent Decree for the Chemical Control Superfund Site - August 1990
- Operation and Maintenance Manual - August 1993
- Operations and Maintenance/Post Remediation Monitoring Plan - 1999-2001
- Letter from Chemical Control Group through John P. McBurney on Review of the O&M Program - June 2000
- Focused Remedial Assessment for CW-3 Soils - April 2002
- Operation and Maintenance and Post-Remediation Sampling Report - October 2002
- Remedial Action Report - December 15, 1986
- Remedial Action Report - February 20, 1990
- Remedial Action Report - September 30, 1994

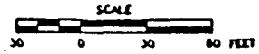
Attachments





LEGEND:

- RAILROAD
- FENCE
- DIRECTION OF FLOW
- SW-2 SURFACE WATER SAMPLING LOCATION
- CW-3 GROUND-WATER MONITORING WELL
- EXTENT OF SOLIDIFICATION



Source: Blasland, Bouck & Lee, Inc.: *Results of August 2000 Maintenance/Post Remediation Monitoring*

Quest Environmental & Engineering Services, Inc.
1741 Route 31 Clinton, NJ 08809
(908)735-8600

Figure 1
Ground Water Monitoring Points
Chemical Control Corporation
Elizabeth, NJ